

From Religious to Scientific Monism²

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1. Cognition is practical in its very nature. It is a tool of practice, and it is produced in practice. This is clear in relation to cognition as a whole, and it is easy to establish this principle with regard to any element of cognition, if it is taken in *life*. Let us take the most abstract idea – ‘existence’. In life, the term has an obviously *practical-directive* character: such-and-such an object (a microbe, a dragon, the workers’ movement, God) ‘exists’ or ‘does not exist’ depending on whether or not it enters into the practical consideration of our efforts in the struggle for life and in the organisation of life. Its existence depends on whether or not it is a factor that influences how we direct our expenditures of energy as well as influencing the results of those expenditures. An imaginary image produced by a mirror or mirage exists. It can be photographed, it can in practice determine a person’s fate, but there is no corresponding object behind the mirror or in the place of the projection of the mirage, and they must not be taken into account in actions that are oriented on these points. In either case, every *question* expresses a need for such a directive tool.

2. A tool provides the *answer*. There could be several answers: different tools could be used to perform the same task. But it would be absurd to cut down a tree with a stone axe, if a steel axe were available. One could calculate the apparent position of the planets by using Ptolemy’s cycles and epicycles, even today, but no one is going to do that. The choice is determined by the practical sophistication of the tool. This results from the application of the following cognitive tool: ‘the criterion of truth is practice’, and, moreover, not individual but collective practice. The collective is always the subject of practice. The tool must be suitable *for the collective*: truth must be objective, i.e. ‘socially valid’, i.e. *socially meaningful*. And this means that the subject of cognition is also that same collective. A cognitive tool is made of collectively organised experience,

1 This appendix is an addition to the 1923 edition [Trans.].

2 This is a very condensed statement of a report that I delivered at the Institute of Scientific Philosophy in February 1923. *The Philosophy of Living Experience* was written more than twelve years ago; since that time my views, developing along the line which was marked out in this book, changed in the direction of a stronger declaration of the ‘sunset of philosophy’ and of the transition to the construction of a purely scientific monism. This report provides a general substantiation of my new position.

just as a technological tool is made from collectively organised matter (the material of things, of physical complexes). And the practical role of a directive tool is that it co-ordinates and organises human activity into actions not only on an individual scale, but also on a collective scale. Cognition does not prescribe the goals of the collective; *these* directives are given to the collective by the struggle for life and development; but cognition does organise the efforts of the collective and directs them toward these goals. Cognitive complexes are collectively produced tools of the organisation of the activities of the collective.

3. But these tools are *alive* and not dead. Their sum total must not be imagined in the form of a mechanical mass of separate tools for separate uses. That sum total develops within the living organism of the collective and must itself be organised in a living form. These tools must not simply lie side by side like implements in a worker's tool-bag or on a bench in a workshop; they cannot but influence one another. They must, by necessity, be assembled into a co-ordinated whole, into an *organised system*. This is the tendency towards 'monism'. It is expressed, first, in a *commonality of structural type* of the cognitive complexes of the given collective, and second, in the production of a complex superstructure of particular *complexes of interconnectedness*, the role of which consists precisely in the organic unification – the application of monism – to all elements and forms of cognition, both existent and emergent. This is the function of the highest generalisations, classificatory models, explanatory hypotheses, and theories.

4. Thus the ideal type of a system of cognition is one that corresponds to the maximum extent – both in its parts and as a whole – to the real tasks of the practice of the collective, and it is a system in which all parts mutually support one another. Such support is realised in all organised systems according to the principle of *complementary correlations*. Thus, all parts of a system of cognition must complement each other in all details, and they must be connected together coherently. This is what makes for the *highest coefficient of useful action* for the expenditure of energy in both acquiring and applying knowledge.

5. For every cognitive complex, the criterion of truth-objectivity is, first, its fitness as a tool in immediate practice, and, second, its harmony with the general system of knowledge. Both, obviously, boil down to the coefficient of useful expenditure of energy from the point of view of the collective in its integral life and development, since, if some complexes were incompatible with others, it would mean diminished productivity in the expenditure of energy – including expenditures of energy in the realm of thought. (It would be difficult to remember these complexes, to orient within them, and to combine them for concrete tasks).

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6. The first form of cognitive monism known to history was the 'religious worldview' or the *authoritarian* system of thought, manifested in the purest form in authoritarian-tribal and feudal society. In these societies, the principle of all classifications and of any regularity boils down to the polar model of *command-execution* with its attendant variations, such as power-subordination, qualitatively superior-qualitatively inferior, spiritual-bodily, sacred-profane, heavenly-earthly, etc. Authoritarian thought contains a kind of automatic polarising mechanism which divides everything – both actions and objects – in the same way. Even cognition itself appears according to this model: revelation from on high, passive acceptance from below.

7. The simplicity and clarity of this form of monism are invaluable because they provide the key to understanding the process by which monism developed. It is perfectly clear that the polar model here is the simple transfer of the practical polarity of authoritarian relations of production – the relationship between the organisers and the implementers of labour – to the sphere of thought. The basic form of social collaboration at this stage of development became the basic form of thought, crystallised in an all-encompassing cognitive model. The organising principle of the economy gave form to the ideology.

But this is not even the primary principle of social being. The basic relationship between people in production originates in the basic technical relationship between a person and a tool. Only when the development of tools led to an organic, stable connection between a given tool and a given individual in the collective, could there also be produced the kind of organic connection whereby one person became the permanent tool of another individual in the collective. Before this, tools were hardly differentiated and were not persistently connected with an individual. They appeared as tools of the primitive collective, and people were not differentiated to the extent that one person could become the tool of another. And after this, when the connection of a particular person with a tool began to lose its organic character and to develop into an irregular connection, the disintegration of the organic authoritarian correlation between people began.

8. Thus a common organising principle, having been transferred from technology to economics, is then ideologically crystallised into knowledge. From this issues the striking coherence of authoritarian formations, the supreme monism of their practice and theory. The directive, practical-organisational role of cognition is not obscured in the least. The religious understanding of the world also simultaneously forms the practical discipline of society. 'The sun commands the ear of grain to grow properly' – this is how one ancient Egyptian inscription expressed the causal relationship of the basic facts of agriculture. And the son of the sun – the pharaoh – ordered the peasants to contribute three grains from each ear to his granary. The one was as nat-

ural, incontestable, and understandable as the other. Theoretical reason had not yet been distinguished from practical reason. And God – the living, concrete image of their general monism – was also objective and socially incontestable in the same way that ‘energy’ is now the necessary formula of monism for the technology of machine production and for contemporary physics that has developed out of it. And the origin of God (the theoretical centre) from a distant ancestor (a practical organiser) clearly underscores the coherent unity of being and thinking of the people of that time.

9. This system was elementally conservative throughout. The very nature of authoritarian social collaboration was conservative, and authoritarian thinking was even more so. Thinking is always more conservative than practice – the living experience that forms and reinforces it. But life – albeit slowly and often imperceptibly – overcomes the tendency to conservatism. Within the forms of religious monism, experience nevertheless broadens, and knowledge of the interconnectedness among phenomena is built up. Chains of causality become longer and more sophisticated, fully in harmony with the manner in which authoritarian chains of authority and subordination become longer and more sophisticated in practice. And although this understanding of causality was authoritarian, it did not lose the element of regularity in the least. After all, in real life, government was not entirely reduced to arbitrary rule. In practice, in the overwhelming majority of cases, the authorities governed in conformity with habit and tradition; in reality, arbitrary rule was an exception.

10. From this point of view, one must understand the role of the conception of a ‘miracle’ in the development of cognition in a completely new way. A ‘miracle’ served to *support and strengthen* the idea of the regularity of phenomena. Everything that did not fit into the natural determinism that had been worked out and that would radically undermine faith in it (an eclipse of the sun, an earthquake, plague, etc.) was considered to be the *special and particular* intervention of the supreme authoritarian will, originating outside of and apart from that regularity and having no relation to it. Thus, things were set aside, as it were, from it, and they therefore did not destroy cognitive faith in it as a real and altogether stable regularity. Thus the wholeness of the system of thought was preserved, and it was able to develop through the accumulation of experience and knowledge.

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11. But little by little the course of events undermined the wholeness of practice itself. The boundaries of the *division of labour* – ‘specialisation’ – cut into it more and more deeply. Society was broken up into groups with increasingly different kinds of labour-experience. Points of fragmentation and anarchy developed in the organisation of pro-

duction; the market was born and the exchange of goods progressed. And although thought is more conservative than practice, it still must follow after practice; it is only delayed. The former wholeness of thought fractured along those same lines of specialisation. For a peasant, the majority of practice – and therefore of knowledge – is not the same as for a blacksmith, and it is different still from that of a cobbler, a merchant, and so on. In the technological process, knowledge becomes specialised, originating precisely as the practical knowledge of one or another field. In part, knowledge was acquired through oral tradition, in part, through imitation in work itself: ‘science’ and ‘skill’ were only beginning to be differentiated from one another.

12. Nevertheless, the scope of such specialised knowledge was at first much broader than what we now understand as the specialised, technical sciences. Thus the knowledge of a farmer was certainly not limited simply to the rudiments of agronomy; it also included elements of calandarian astronomy, the geometry of areas, animal husbandry, veterinary science, and also, of course, arithmetic for the accounting of seeds and vital supplies, etc. The ‘science’ of the blacksmith included not only metalworking but also, usually, metallurgy, certain elements of the geometry of forms, and, it goes without saying, mechanics, physics, chemistry, and, similarly, arithmetic and domestic bookkeeping on a greater scale than for a peasant. The merchant requires, of course, even more knowledge of arithmetic and bookkeeping, but also merchandising, and, to the extent that the merchant is engaged in transportation, knowledge of astronomy (for orientation), geography, ethnography, etc. But each of these diffuse systems of science or skill has its own central core (for the peasant, agronomy; for the blacksmith, metalworking; for the merchant, bookkeeping, etc.), and, to the extent that knowledge is built up and its precision and coherence grows, that core develops into a real technical science that is subsequently formalised in written language.

13. Besides these technical-scientific complexes – and going far beyond their boundaries – *general* knowledge, *general* techniques and methods that have application in the most varied fields of the social division of labour also needed to be specially systematised. Techniques and methods of numerical accounting were separated out and organised in the form of arithmetic. Techniques and methods for measuring and comparing space took the form of geometry. Methods of orientation in space and time provided the basis of astronomy. Knowledge related to the resistance of materials, having significance for all aspects of labour, was organised into mechanics and later physics. Methods of harmonising ideas in deliberations among members of the collective and later in individual cogitation – important, yet again, in all aspects of human activity – were specialised into the form of ‘logic’, and so on.

14. So the subdivision of labour in society led to the ideational subdivision of experience; and the people in the collective were subdivided in the same way. The stereotypical unity of the religious phase was destroyed: knowledge spread among people

unequally and in heterogeneous bits. The coherence that was taking form in each technological science and especially the broad commonality of application of the findings and methods of the meta-technological, generalising sciences were, of course, *elements* of a new monism, but monism *as a whole* did not yet exist. In the presence of sharp differences in specialised practice, the fundamental cognitive relationship toward them also became different: special forms of thinking were produced by each specialty. If one recalls the directively organising role of cognition, then it is immediately clear how unlike the tendencies of, let us say, the peasant, the blacksmith, and the merchant must be. The peasant continually deals with the forces of nature – with indefinitely changeable resistances (conditions of soil and weather), with implements and objects of labour that are alive and that are subject to diseases that the peasant is powerless to treat, and with unforeseeably and inevitably variable results of labour. The circle of peasants' interests is limited almost exclusively to their parcels of land. On the other hand, blacksmiths are seldom affected by the forces of nature. They operate with stable and definite conditions of labour, with implements that are inorganic and stable, and they can predict the results of their labour with great precision. Blacksmiths' circle of interests expands beyond the walls of their workshops due to necessary, continual dealings with customers and the market. Finally, for merchants both the conditions and the results of their activity are again indefinite and fickle, but they are dependent not on nature but on social spontaneity. Merchants' relation to objects is completely different from the two other cases. Merchants do not improve objects but rather preserve them and move them from place to place; their focus of interest unfolds uncertainly together with their field of activity – the market. It is not only the *material of their knowledge* that is different, but also the *direction* of the thinking that is brought to bear on that material.

15. The systematisation of cognitive tools is accomplished in all cases, however, leading to a certain semblance of monism. Each group looks *on everything* consistently from its own point of view; there is a certain wholeness in each group's understanding of the world. But this wholeness has only the limitedness of its labour – the experience of differentiated fractions of the collective – as its basis. It is therefore existentially unstable, and it falls apart whenever life deviates from its usual course. The elemental power of the market can incomprehensibly crush the economy of a peasant whose thinking is built on managing land. Fire can destroy the small enterprise of a handicraft worker, providing a bitter reminder of the power of nature, a power that had been forgotten in the workshop. Then cognitive helplessness is added to the practical, existential losses, and this undermines faith in the accustomed pillars of support – the very 'meaning' – of life.

Such is the 'sub-monism' of the social group (a monism that is imperfect and incomplete).

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16. Specialisation broke up the unity of the collective but did not completely dissolve it. Many threads of communication were preserved and interaction existed among groups – crossovers and crisscross connections. In the common field of the market, apparent antagonism concealed real social collaboration. There was a need to escape beyond the constraints of unstable, unreliable ‘sub-monisms’ to co-ordinate heterogeneous cognitive tools, and this need made a path for itself by creating a new type of ideology and a distinctive social type as its bearer: these were *philosophy* and the *philosopher*.

In their initial form, philosophers began with an unusual breadth of individual experience plus an unusually developed capability to organise it. These were the ‘sages’ of classical antiquity. They were neither bookish theoreticians nor contemplative hermits; they were people of life and experience, for the most part well-travelled, who had conversed with people of various social strata and of various nations, observed their practice, gathered those people’s knowledge and perspectives together, and then, through intense psychical labour, organised it all into one coherent whole. Being encyclopaedists and monists, these philosophers appeared to people who were out of touch and limited as a kind of higher being. Often, thanks to the breadth of their experience and familiarity with various methods, they could get people out of a practical dead-end, but even in cases where this was not within their power, they saved people from overwhelming cognitive helplessness or moral despair. Approaching the matter from a new, unexpected point of view, sages made understandable what was painfully incomprehensible, and they reconciled what was painfully contradictory in an acceptable way. In a bad situation, philosophers pointed out a basis for transition to something better. They were singular personal incarnations of the inner interconnectedness of a collective that was outwardly falling apart.

18. But these teachers of life were only human beings and could synthesise only the material that they found in their social environment. And this environment was continually changing. People continued to be atomised, and social relationships became more complex. Many new facts accumulated, and the previous synthesis became inadequate. A philosopher is never altogether *completely* satisfactory – this is attested to by their ‘debatableness’ even in their own times. Another sage would seize upon other instances of life, gather different materials and methods, and work out different systems that disagreed with the first but were in themselves no less rich and coherent. And later both sages ceased to satisfy thoughtful people; a new sage-encyclopaedist appeared on the scene, constructing an edifice on a broader foundation. But this edifice also awaited the very same fate, and so on. When the class structure of society is sufficiently formed, with truly irreconcilable class contradictions, then synthesis becomes possible only within the framework of

a class, and the synthesis of an aristocratic sage will inevitably be different, for example, to the synthesis of a plebeian sage.

19. Accordingly, in the best of times philosophy gives only a debatable '*quasi-monism*' that is quickly superseded. It cannot be otherwise: the organisation of knowledge is determined by the organisation of practice; when the latter is atomised and pluralistic, then the former cannot become objectively whole. The cultural value of the systematisation of knowledge is relative, in general, and, to the extent that progress quickens and the contradictions of life become deeper, it becomes all the more relative. This does not, however, prevent that value from being huge. Since only systematisation creates a broad basis for further ideological development, quasi-monism is nevertheless a form of organisation which is necessary and preferable, as long as there is no ground for another.

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20. But there comes a time when even the quasi-monism of the philosopher-encyclopaedist turns into an unattainable ideal. Growing specialisation of knowledge – the proliferation of scientific fields with isolated methods and a huge, overwhelming accumulation of material – leads to a situation where an encyclopaedic embrace of the world of knowledge is no longer possible for anyone, no matter how great a genius. At that point, a curious transformation occurs: all-conquering specialisation overwhelms philosophy, which is itself transformed into a speciality and then into quite a number of specialties. A new type arrives on the scene: the *philosopher-specialist*.

21. These are no longer people of life but people of the study. For them the material of experience is not encyclopaedic but specialised. First, it is bookish material, including past and present attempts at a philosophical synthesis plus whatever fragments of scientific data happen on a philosopher's way. Second, the material is 'inner', 'self-contemplative' experience that is obtained by 'retreating into oneself', where, it goes without saying, philosophers cannot find anything other than the well-established forms of thinking of their class and of their social group.

22. What kind of synthesis can be worked out on such a basis? It is obvious that the reality of experience that has been broken up and that continues to be further broken up cannot be cognitively organised into a unity on a *real* basis. Monism, consequently, is constructed *outside* the boundaries of what is real. But outside these boundaries there is neither experience nor cognition. What is there then? The *metaphysical* or *transcendent* world. This is the world of *verbal constructions*. It is on this basis that the various forms of *pseudo-monism* of specialised philosophy spring up.

It could not be otherwise. The starting point of the new constructions is the presence of previous constructions that are delivered, of course, in verbal symbols. And the

significance of these symbols *changes* from generation to generation, from class to class, from social group to social group, and even from one task to another, to the extent that those tasks are relatively specialised. Because of this, a word is a splendid tool for unifying what is really not unifiable, for reconciling what is not reconcilable. A stable word as the expression of a variable idea – this is the basis of philosophical synthesis at this level of development.

23. Multiplicity (and therefore both the debatableness and the instability that philosophical systems obtain on such a basis) gave rise to a vague awareness of the unreliability of the methods by which such syntheses were constructed and impelled philosophical thought to seek more reliable, so to speak ‘guaranteed’ methods. This led to the investigation of the ‘conditions of cognition’, its ‘premises’, its ‘boundaries’, etc. – in general to what is called ‘epistemology’. Here, however, the question is not about the biological and social conditions of cognition – not about its origin as a living fact – but of ‘logical’ conditions, found by way of ‘critical thinking’. In its essence, the task is to derive the premises of thought from thought and by means of thought in exactly the same way as trying to drag yourself out of a pit by your hair. Thus there appeared the vast and subtle modern scholasticism, ‘critical philosophy’ – which in reality is *pseudo-criticism*.

24. The actual development of philosophy was not so straightforward as we have described it, because the development of the life of society does not express itself along simple lines. There are cycles: civilisations collapse and then are followed by repetitive movements through phases that are similar to former ones and are complicated by the partial use of the creative work of previous cycles. Between the broad quasi-monism of the philosopher-encyclopaedists and the armchair pseudo-monism of specialists, there are many transitional forms. In the receding wave, there are recurrences of the surge, since philosophy, after all, reflects on a general scale the fluctuations of real life. The next form of philosophy reveals the influence of the successes of the scientific-monistic tendency, about which more will be said later, although it already existed in a hidden form in the very earliest eras of the development of philosophy.

25. In any event, by using pseudo-criticism, philosophy cannot by itself escape from the framework of quasi-monism and pseudo-monism. And this is precisely because the real disruptions in life that give rise to philosophy remain outside its field of vision. Philosophy cannot see the collective that is hidden beneath isolated functional elements and the anarchic struggle between those elements. It is also incapable of grasping the living unity of labour and experience, of practice and cognition. For philosophy, the subject of experience and cognition is only the individual, and cognition itself has a contemplative and explanatory – and not an organising and directive – character. This fetishism of individual and self-sufficient cognition is the inevitable limit of its achievements.

26. This also explains the peculiar relationship of philosophy to religion. The principle of philosophy, obviously, is inconsistent with the principle of religion, since it

corresponds to a fundamental difference in their social bases – authoritarian versus anarchistic social collaboration. But philosophy is incapable of ejecting religious monism not only from the consciousness of the broad masses but even, to a certain extent, from its own consciousness. There is an objective cause of this in the sphere of practice: commodity-exchange society – and in particular bourgeois society – cannot be built entirely on the principles of specialisation, economic anarchy, and individualism: it would then simply fall apart. Its unifying organisation of class rule – the state with its bureaucracy and army – preserves a more or less authoritarian form; and its basic cell – the private enterprise, whether a family enterprise or one that has expanded into a capitalistic factory – also unavoidably contains remnants of authoritarianism, which support its wholeness and coherence of function. Organisation of any another type is in principle alien to this society. And therefore the monistic tendency in philosophy is always tinged with authoritarian thinking to one degree or another. Sometimes philosophy straightforwardly includes denatured religious models of an abstraction – of God, for example – and sometimes it imparts certain characteristics, borrowed from these models, to its ultimate conceptions. After sufficient analysis, this can be discovered even in the most radical and atheistic systems.

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27. Progress in the division of labour is the principal and most noticeable tendency in commodity-exchange society, but it is not the only one. The interconnectedness of the collective is hidden, but this does not mean that it has ceased to exist; it is growing even deeper and stronger. Some parts of the whole depend increasingly on others and are increasingly less able to live outside this interconnectedness. Communication between various specialties of both physical and psychical labour, though little noticed, nevertheless continues to exist, sometimes weakening and sometimes growing stronger. Methods develop in each field not only independently and in isolation; they percolate up from one field into another, sometimes slowly and imperceptibly, sometimes in major breakthroughs. The majority of technical and scientific revolutions were accomplished by the transfer of methods and, along with those methods, the points of view which are inseparably connected to them. For example, transportation was transformed in the nineteenth century by the application of steam engines which had been created in industrial technology. A new type of motor that provided the basis of aviation was the result of the application of the technology of explosives that had been developed in various fields having to do with the military. Lavoisier transformed chemistry based on the techniques of precise weighing that had originated in the mining and jewellery trades. The methods of physics and chemistry made physiology into an exact science, and an analogous role was played by the methods of physiology in

psychology. Marx brought the essential point of view of the natural sciences into the social sciences. The list could go on. In all these ways, the sum total of the common content of various fields of experience and thought increased step by step, beneath the exterior of their formal isolation. This hidden *monism of science* grew and manifested itself from time to time by bursting the formal boundaries between scientific fields. A clear example is the gradual merging of various sciences that have now formed a system of physics, chemistry, and theory of the structure of matter (so-called 'physico-chemistry'), which apparently also includes geometry.

28. The monism of science simply did not become apparent for a very long time and in any event did not rival the pseudo-monism of philosophy. The division of the major fields of science remained. Philosophy, when the opportunity presented itself, used the highest generalisations of science as material for its unifying constructions. Scientists, even those who mastered the broadest scope of knowledge, retained the psychological outlook of specialists; they did not consciously strive toward scientific pan-monism and considered the pursuit of monism to be the business of philosophers. Philosophers, for their part, did not even contemplate the possibility of transferring the pursuit of monism into other hands.

Moreover, both philosophers and scientists understood monism contemplatively, supposing it to stand outside of any connection with practice, outside real verification. And this is the basic difference between philosophical and scientific constructions: that the first are not subject to direct verification by observation and experiment, while the second are ultimately accepted or rejected only on that basis.

29. A fundamentally new point of view was necessary in order to overcome the traditional understanding of the connection between science and philosophy. This point of view had to ascend above the narrowness of specialisation in general, above individual knowledge, and above the detachment of knowledge from practice. These revolutions in points of view would be possible only as a result of the emergence of new classes with new forms of social collaboration. This is what actually happened. The industrial proletariat entered the historical arena. And although proletarians themselves were not initially either scientists or thinkers, still the *position of a class* in the system of social life is an objective fact, and it creates the possibility for an intellectual, even though not belonging to that class, to adopt their position theoretically and thereby acquire a new point of view. This is what Marx succeeded in doing.

30. The position of the industrial proletariat permits the fetishism of the 'abstract' – the detachment of cognition from practice – to be overcome. This is because, as science performs its task in the conditions of machine production, its directly organising character becomes increasingly clear, a character that is clearly expressed in the concept of 'scientific technology'. This directly organising character is equally evident for the role of social-scientific cognition in the class struggle of the proletariat.

31. The individualistic understanding of labour-experience is overcome as a consequence of the fact that, under the conditions of the labour-experience that are created for the working class, there develops a real and perceptible collectivism and the momentum of the disunity of interests and aspirations progressively weakens. On the one hand, there is the objective accumulation and systematic organisation of the strength of workers within the bounds of individual enterprises, and, on the other, there are the organisational demands of struggle.

32. The narrowness of specialisation is overcome along two paths. First, in practice, specialisation takes on new forms, although, of course, it certainly is not eliminated. Second, the needs of labour and social struggle carry proletarian consciousness far beyond the boundaries of the horizon of specialties. The former is revealed – as the transition is made from the lowest to the highest stages of machine technology – in that the basic content of labour on different machines becomes continually more similar. Purely physical effort, with its strict differentiation of skill, occupies a decreasingly important place in labour, and gives way to effort of an intellectually volitional kind that corresponds to the ‘organising’ function of the management of machines (attention, supervision, comparison and collation of the data provided by various ‘indicators’ of the machinery and the understanding needed for intervention in the course of its work). These kinds of interventions, which require a specific cultural preparation, are relatively common for workers of various specialties of machine industry. The possibility of mutual understanding in labour and of mutual support among workers continually grows – for example, advice can be given in the event of a malfunction in the working of the machinery, workers can temporarily stand in for one another, and a short course of training can be provided for transfer to another specialty. Elements of a new form of social collaboration – *collectivistic* or *synthetic* – combined with the basic characteristics of both *organisational* and *implementational* labour are developed, accumulated, and organised, and they rise above the fundamentally limited systems of authoritarian and anarchistic social collaboration alike.

33. There is another side to the matter: the directive cognitive needs of the working class have a propensity toward universality. Leaving to one side the narrow opportunities for the education of workers today, what, as a matter of fact, must metalworkers learn in order to attain the maximum effectiveness in their work? By no means should their education be limited only to metal technology as a part of applied mechanics, but it obviously also should have general mechanics as its theoretical foundation. Both applied and theoretical mechanics are inconceivable without algebra and geometry. Then there is the theory of steam power (applied and theoretical) for steam engines, electro-technology (with the theory of electricity for electrified manufacturing as its foundation), and in part also chemistry (which also, after all, is necessary for metal technology), and so on.

The economic trade-union and class struggle for the improvement of the conditions of labour requires, of course, an understanding of what is involved in the rational arrangement of the conditions of labour, i.e. knowledge of hygiene and sanitation along with physiology and anatomy as their foundation. This leads, once again, to physics and chemistry and also in other aspects to biology. In essence this entire group of sciences, which encompasses questions of the struggle of an organism with its environment for survival, represents an *education in workers' power*. On a wider scale, this same economic struggle and the political class struggle also require a command of the basic social sciences and of social philosophy, while the ideological struggle requires a mastery of the basic sciences of culture.

It is obvious that the scientific needs of a textile worker hardly differ from those of a metalworker as summarised above.

Such are the *objective* needs of the working class regarding knowledge, the *objective* needs of its labour and struggle, despite how insufficiently, unsystematically, and disjointedly satisfied they are, in reality and to the detriment of the class.

This universalism of cognitive needs issues from the universal-organisational role of the working class – the collective organiser of things, people, and ideas. The vital necessity for such universalism does not exist, or more accurately, until now has not existed for the bourgeoisie nor even for the organisational intelligentsia – technical, bureaucratic, and other. For example, individual engineers, mechanics, or technicians who need to seriously study one basic group of sciences connected with their specialty do not need to study hygiene, physiology, biology, etc., since they do not need to struggle to improve the sanitary conditions of their work. Such specialists can also more easily get by without political economy, a theory of progress, or a doctrine of the state, etc., since their positions do not by their very nature impel them to carry on a broad economic and political struggle; their careers are completely individual and not collective. At the very least, this is how the matter stands for them in normal, organic eras. Revolutionary eras push all classes and groups towards encyclopaedism, since all aspects of life are unstable. But the difference in the degree of this tendency, of course, remains.

By the power of his genius, Marx, as far back as the 1840s, captured the basic point of this new position. In his eleven theses,³ he concisely expressed both the connection between cognition and practice ('the criterion of truth is practice' ... 'philosophers have tried to explain the world – but the point is to *change* it') and the objective collectivism of practice ('people in their practice are social beings') and thus also of cognition. Later, Marx even went on partly to develop this idea in his theory of commodity fetishism as a form of thinking, in which, in passing, he defined objectivity as 'social meaningfulness'

3 Marx's 'Theses on Feuerbach' [Trans.].

(page 44 of I. Stepanov's translation of 1920). He did not draw the conclusion that the role of philosophy is transitional, but it is clear that monism – verified by the practice of changing the world (i.e. the experience of labour and struggle) – is *not* philosophical but *scientific* monism. Marx's *historical* monism partly, but essentially, represents this. There was insufficient material available at that time for taking up the question of a fully scientific monism.

36. But now there is much more of such material. The vast field of physico-chemistry has been given a monistic form by energetics; the principle of relativity, it would appear, has not only developed this monism further, but it has incorporated the field of geometry within it. The point of view and methods of physico-chemistry are increasingly taking over the biological sciences. The methods of the social sciences, on the foundation of Marxism, are approaching the methods of natural sciences and in many important cases have already achieved the possibility of prediction. On the other hand, there has arisen the *theory of analogies*, i.e. the unity of models of regularity for the most heterogeneous phenomena, for spheres of experience that are most distant from one another. The fundamental pluralism of scientific points of view and methods is coming to an end.

37. What path must be taken, then, if scientific monism is to be realised? It must appear by means of a unity of methods for the resolution of all possible tasks. And it can arise only from a unity in the very understanding of these tasks, how they are formulated. This formulation will be *universal-organisational* (tektological).

In reality, any task of practice or cognition, from a task in elementary arithmetic to the task of restructuring the world, boils down to organising a certain sum of elements into a cohesive and coherent whole. This means that all methods of resolving such tasks are, in their very nature, organisational methods. To discover and to generalise these methods completely means to establish universal organisational natural regularities. This task is *not* philosophical but scientific, since all organisational methods and natural regularities are entirely subject to active verification in labour-experience, in construction, and in struggle.

Universal organisational science is the completely natural ideology for the class that is itself of a universal-organisational type.

Religious monism was a *conservative* universal-organisational form of practice and thought. Scientific monism is a universal-organisational form that is *dynamic*.